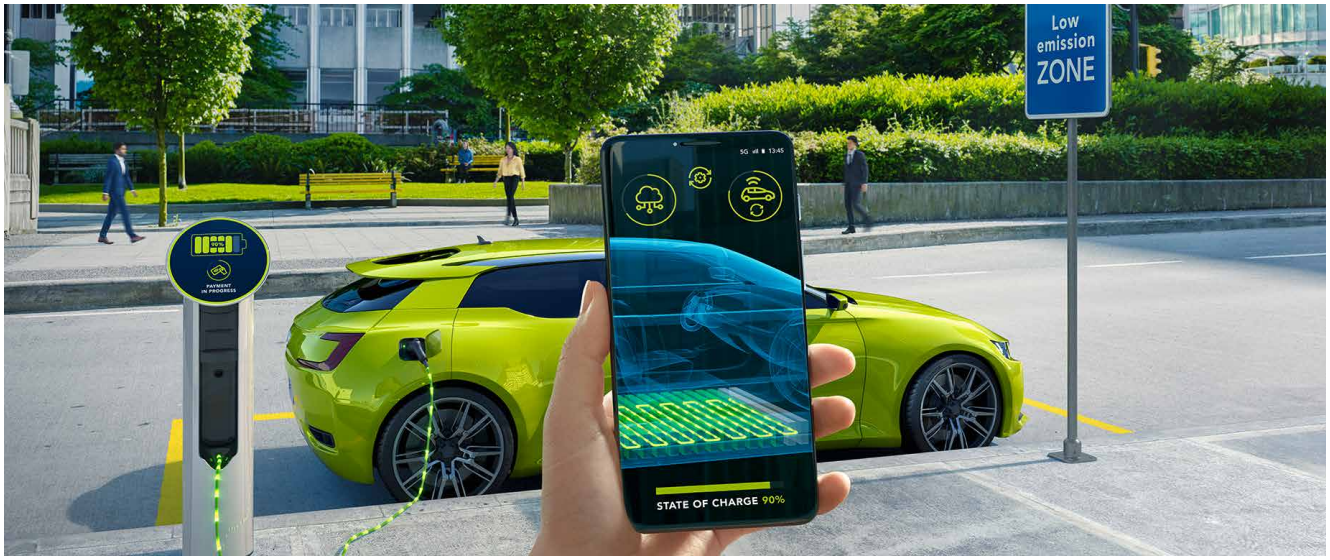
BMA7004: 4 Cells Battery Cell Controller IC

Robust, reliable analog solutions



Battery cell controller solution enabling reliable and safe low-cost Li-ion cell control applications with affordable, robust and high-speed isolated communication.

The BMA7004 battery cell controller IC is designed for automotive and industrial applications such as HEV, EV, ESS and UPS systems. They feature ADC conversions on the differential cell voltages with averaging up to 256 samples and current and temperature measurements as well as coulomb counting. Embedded balancing transistors and diagnostics simplify various applications. The devices communicate either via standard SPI or a transformer isolated daisy.

Key general features

- Isolated 2 Mbps differential communication or 4 Mbps SPI
- Bi-directional transceiver
- Up to 4 cells voltage and stack voltage measurements
- Configurable averaging of cell voltage measurement up to 256 samples
- Synchronized cell voltage/current measurement with coulomb counter
- High accuracy of synchronized coulomb counter & current measurement at ±0.5% (±1500 A)
- 7 ADC/GPIO/temperature sensor inputs
- Onboard 300 mA passive cell balancing with diagnostics

Target applications

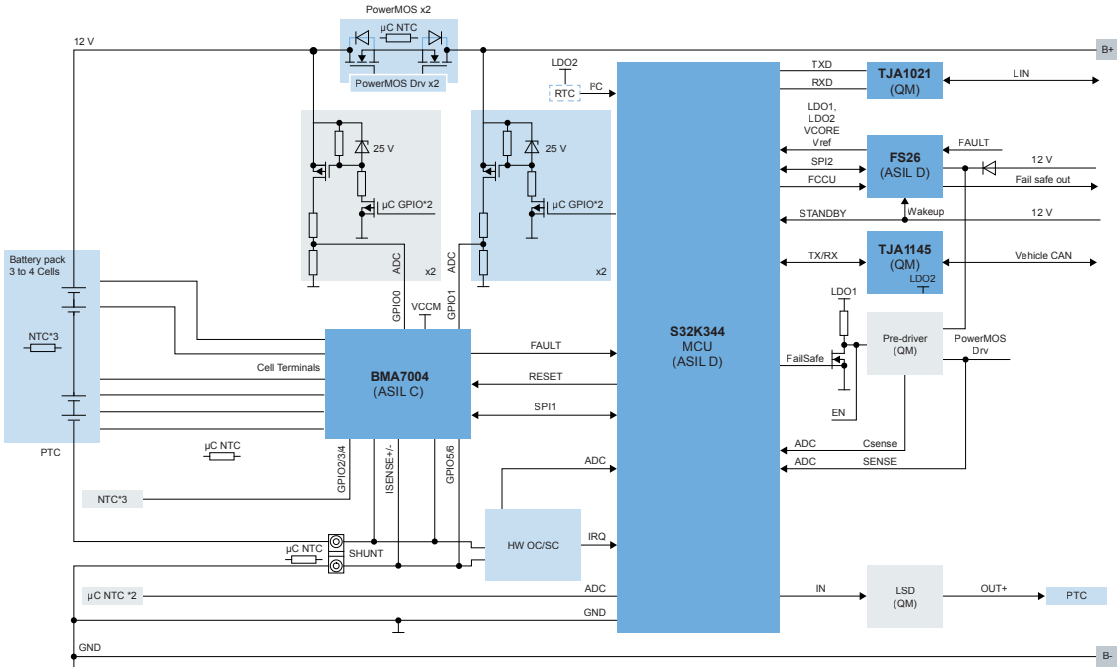
- Automotive 12 V BMS

Enablement tools

Software drivers:

- Lite version – downloadable on nxp.com
- Full version – downloadable on Docstore

Main application block diagram



Parameter	
Voltage Channels	3-4
Supply VRange (Max)	6 V–30 V (40 V)
Cell Input Voltage Range	-0.3 V to 5 V
Measurement Error	± 0.8 mV (Vcell =3.3 v Ta = 25°c)
Total Measurement Error after ageing	± 3.9 mV
	Vpwr=6 V–30 V, Vcell= 1.5 V–4.3 V, -40~85 °C
Measurement averaging	Configurable Averaging Samples 2n n=0–8, (1,2,4–256)
Functional Safety	ASIL C / ASIL D Compliance
Isolated communication Speed	2 Mbps
Communication Isolation	Inductive, Capacitive
Max Nodes per Daisy Chain	63
CRC Bit	8
Comms bit	48
Integrated Balancing	<300 mA, Timer
Balancing sleep mode	Yes
GPIO / Analog measurement inputs	7
I2C Master	EEPROM Only
Current Channels	1
Coulomb counter	1
Package	48-pin LQFP-EP (-40~105 °C)

Orderable samples

Part Number	Temp Range	Number of channels	Current Channel & Coulomb Counter	Package
SBMA7004TAIAE	**-40 to 105 °C**	**4**	**Yes**	**48-pin LQFP-EP**

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